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Combination Of Waste Glass and Raw Bentonite in The Manufacturing of Alkali-Activated Mortar

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Abstract

This research investigated the influence of raw bentonite as well as waste glass as alternatives to calcium carbonate and normal sand on the properties of alkali activated mortar. Raw bentonite has been used to replace calcium carbonate partially with ratios of 25, 50 and 75 % by mass. Waste glass aggregate has been utilized to replace sand at levels of 0, 75 and 100% by mass. Six mixes have been planned prepared and examined. Alkali activator type and content is the same for all mixes with silica modulus of 1.5. high temperature treatment of the casted samples has been applied up to 1000 ℃ in order to study the late calcination of raw bentonite of the performance of alkali activated mortar. Mechanical properties as well as microstructural characterization have been carried out. The obtained results revealed that replacing calcium carbonate with raw bentonite improves thermal stability of the mixture at high temperature. Additionally, compressive strength is improved and weight loss is decreased after exposing to 1000 ℃. The use of crushed glass as a fine aggregate in alkali activated mortar exhibited better performance than normal sand when high temperature exposure is applied due to sintering and solidification of the material.

Keywords: Geopolymer Concrete, Alkali Activator, Bentonite, Thermal Treatment